REMARKS

Claims 1-10, 12-29, 32-33, and 50 were presented for examination in the present application. The instant amendment adds new claim 51. Thus, claims 1-10, 12-29, 32-33, and 50-51 are pending for consideration upon entry of the instant amendment. Claims 20, 22-24, 27, and 33 have been withdrawn, but remain pending for rejoinder upon allowance of a generic claim. Claims 1, 50, and 51 are independent.

Claim objections

Applicants submit that the prior, entered amendments to claims 1 and 15 obviated the objections thereto. Accordingly, reconsideration and withdrawal of the objections to claims 1 and 15 are respectfully requested.

Rejections under §112

Claims 2-4, 16, 25-27, and 29 were rejected by the Final Office Action under 35 U.S.C. §112, second paragraph.

The §112 rejections to claims 16 and 25-27 were withdrawn by the Advisory Action. Thus, the rejections to claims 2-4 and 29 remain. Specifically, the Office Action and the subsequent Advisory Action assert that claims 2-4 and 29 merely recite mathematical equations without reciting any positive step.

Claim 2 has been amended to obviate these rejections. Specifically, claim 2 now recites the step of "controlling the melting unit so that the temperature of the melt is in the range from T_{eff} - 20% to T_{eff} + 20%".

Applicants submit that claim 2, as well as claims 3-4 and 29 that depend therefrom, now clearly meets the requirements under §112. Reconsideration and withdrawal of the §112 rejection to claims 2-4 and 29 are respectfully requested.

Rejection under §103

Independent claims 1 and 50, as well as dependent claims 2-6, 8, 18-19, 25, 29, and 32, were rejected under 35 U.S.C. §103(a) over newly cited U.S. Patent No. 4,133,969 to Zumbrunnen (Zumbrunnen). Dependent claims 6-7, 10-12, and 26 were rejected 35 U.S.C. §103(a) over Zumbrunnen in view of newly cited U.S. Patent No. 5,738,811 to Gagel et al. (Gagel). Dependent claims 13-14 and 16-17 were rejected 35 U.S.C. §103(a) over Zumbrunnen in view of newly cited International Publication No. WO 0216274 to Rodek et al. (Rodek) as represented by corresponding U.S. Patent No. 7,694,533. Dependent claims 8-9, 14-15, 21, and 28 were rejected 35 U.S.C. §103(a) over Zumbrunnen in view of newly cited International Publication No. WO 0114266 to Romer et al. (Romer) as represented by corresponding U.S. Patent No. 7,137,277.

In the interest of clarity, claims 1 and 50 have been clarified to obviate these rejections.

The Office Action asserts that the energy consumption per unit weight would be essentially an overall heat balance of the process and the energy consumption would be based on the overall heat balance of the process.

Applicants respectfully disagree.

Rather, Applicants submit that the energy consumption per unit weight has to be multiplied with the number of unit weights of the melt discharged in a given time interval. Then, one would obtain the energy balance of the total energy consumption within this time interval. On the other hand, this number of unit weights which is related to the throughput is strongly dependent on the temperature. This is, since the required residence time is strongly dependent on the temperature.

The overall energy consumption (per time unit), which according to the examiner would be minimized in Zumbrunnen is also dependent from the temperature. However, this dependence is different. The higher the temperature, the higher are the heat losses, and, consequently, the higher is the overall energy consumption per time unit. Consequently, the overall energy consumption is minimized by minimizing heat losses. This in fact is what Zumbrunnen teaches. For example, in col. 10, lines 14 to 19, Zumbrunnen discloses that the energy to operate the device is minimized. This minimization, however, does not account for the required residence time of the melt. In particular, this minimization is not identical to the minimization of the heat consumption per unit weight of the discharged melt, as the latter depends on the residence time which in turn depends on the temperature. This temperature difference is opposite to the temperature dependence of the overall energy consumption. The overall energy consumption increases with temperature and the residence time (and coming along therewith the energy consumption per unit weight) decreases unless T_{eff} is not exceeded.

In order to further clarify this distinction, claim 1 now recites, in part, the step of "selecting a temperature T_{eff} at which an energy consumption per unit weight of the inorganic materials to be melted is at a minimum".

While claim 50 has been clarified to now recite, in part, the step of "selecting a temperature T_{eff} at which an **energy demand per unit weight of finished molten material** is at a minimum".

Thus, the selected temperature is based on the energy consumption per unit weight of the inorganic materials that are to be melted (claim 1) or the energy demand per unit weight of finished molten material (claim 50).

Again, Zumbrunnen merely discloses that the direct coupling of the melt 16 to the current source 14 of the electric furnace 10 of the present invention also allows for passing an electric current through a powder of electrically conductive material, providing that material has been packed sufficiently to establish an unbroken current path therethrough. Obviously, once a current flow is established, the powder will be liquidized and, thereafter, additional solid materials could be added to maintain the melt level at the desired distance or spacing from the forward conductor 15. See col. 12, lines 10-20.

Thus, Zumbrunnen at best discloses adding additional powdered material to maintain the melt level the desired distance from the conductor. However, there is simply no disclosure in Zumbrunnen regarding selecting a temperature as now required by clarified claims 1 and 50.

Further, Zumbrunnen discloses an arrangement for closely controlling the outer temperature of the skull 11 and heat transfer therethrough, along with the ability to closely control the melt current thereby controlling the melt temperature. Here, the electric furnace 10 provides a close balancing between melt heat input and skull temperature to minimize the energy required to operate the device providing, thereby, a most efficient energy utilization. See col. 9, line 66 through col. 10, line 20.

Again however there is simply no disclosure in Zumbrunnen regarding selecting a temperature in the manner recited by clarified claims 1 and 50.

Rather, Zumbrunnen clearly refers to the overall energy consumption of the crucible, which is not what is recited by claims 1 and 50. It is not the aim of claims 1 or 50 to keep the overall energy consumption as low as possible. .

The Office Action failed to address the claimed energy consumption, which refers to the energy consumption or demand per unit weight.

In fact, the overall energy consumption of the skull may not minimal if operated at the claimed temperature. Applicants submit that it is a surprising finding that the energy consumption per weight unit can be reduced to a minimum at operating conditions where the melt temperature and hence the overall energy consumption is very high. There is simply no disclosure or suggestion in Zumbrunnen for this finding.

The Office Action fails to assert that any of the remaining references, namely Gagel, Rodek, and Romer, cure the aforementioned and other deficiencies present in Zumbrunnen.

Therefore, present claims 1 and 50, as well as claims 2-10, 12-19, 21, 28-29, and 32 that depend therefrom, are not disclosed or suggested by the cited art. Reconsideration and withdrawal of the rejections to claims 1-10, 12-19, 21, 28-29, 32, and 50 are respectfully requested.

Applicants respectfully request rejoinder of withdrawn claims 20, 22-24, 27, and 33, which depend from allowable claim 1 discussed above.

New claim 51

Claim 51 has been added to point out various aspects of the present application. It is submitted that claim 51 is directed to the elected embodiments. Support for new claim 51 can be found in the specification at least at page 3, lines 1-4. No new matter is added.

Applicants specifically point out that new claim 51 is not intended to be limited to the specific mechanisms of patentability previously argued with respect to any prior

claims in this or any related applications. Accordingly, Applicants hereby rescind any disclaimer of claim scope and, thus, any prior art for which such a disclaimer was made to avoid may need to be revisited by the Examiner with respect to claim 51.

It is believed that claim 50 is in condition for allowance. For example, claim 51 recites, in part, the steps of "selecting a temperature T_{eff} at which an energy consumption per unit weight of the inorganic materials, **at the required residence time**, is at a minimum".

Applicants submit that the cited art fails to disclose or suggest selecting a temperature at the required residence time as recited by new claim 51.

Summary

In view of the above, it is respectfully submitted that the present application is in condition for allowance. Such action is solicited.

If for any reason the Examiner feels that consultation with Applicants' attorney would be helpful in the advancement of the prosecution, the Examiner is invited to call the telephone number below.

Respectfully submitted,

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